

JOURNAL OF SOLUTION CHEMISTRY—Volume 8, 1979

Journal of Solution Chemistry is a forum for research on the physical chemistry of liquid solutions, covering such fields as physical chemistry, chemical physics, molecular biology, statistical mechanics, biochemistry, and biophysics. The greatest emphasis is on papers in which the solvent plays a dominant rather than incidental role. Most papers deal with experimental investigations of the dielectric, spectroscopic, thermodynamic, transport or relaxation properties of both electrolytes and nonelectrolytes in liquid solutions. Only those studies on pure liquids having bearing on their properties as solvents are considered. Theoretical papers that relate explicitly to measurable solution phenomena and papers describing new or novel apparatus or experimental methods are acceptable. A more detailed description of the editorial policy can be found in the Introductory Statement in the first issue.

Review articles, symposia, book reviews, and a calendar of meetings of interest to the solution chemist may appear from time to time. If the demand warrants it, a section on short communications will be instituted.

EDITOR

Robert L. Kay

Department of Chemistry

Carnegie-Mellon University

4400 Fifth Avenue

Pittsburgh, Pennsylvania 15213

EDITORIAL BOARD

Arthur K. Covington, The University of Newcastle upon Tyne, England

Jacques E. Desnoyers, Université de Sherbrooke, Québec, Canada

Werner Ebeling, Wilhelm-Pieck-Universität, Rostock, DDR

D. F. Evans, Carnegie-Mellon University, Pittsburgh, Pennsylvania

Henry S. Frank, Pomona College, Claremont, California

Felix Franks, University of Cambridge, Cambridge, England

Harold Friedman, State University of New York, Stony Brook, New York

Raymond M. Fuoss, Yale University, New Haven, Connecticut

Loren G. Hepler, University of Lethbridge, Lethbridge, Alberta, Canada

H. G. Hertz, University of Karlsruhe, Karlsruhe, Germany

George Janz, Rensselaer Polytechnic Institute, Troy, New York

Jean-Claude Justice, Université de Paris VI, Paris, France

S. Lindenbaum, University of Kansas, Lawrence, Kansas

Rufus Lumry, University of Minnesota, Minneapolis, Minnesota

R. A. Robinson, University of Florida, Gainesville, Florida

O. Ya. Samoilov, Academy of Sciences of the USSR, Moscow, USSR

R. H. Stokes, University of New England, Armidale, Australia

Editorial Assistant, Georgia T. Killcrece, Carnegie-Mellon University, (412) 578-3127

Journal of Solution Chemistry is published monthly by Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. Subscription orders should be addressed to the publisher. *Journal of Solution Chemistry* is abstracted or indexed in Biological Abstracts, Chemical Abstracts, Chemical Titles, Current Contents, Energy Research Abstracts, Referativnyi Zhurnal, and Science Citation Index. © 1979 Plenum Publishing Corporation. *Journal of Solution Chemistry* participates in the program of Copyright Clearance Center, Inc. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc. for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. It does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts.

Subscription rates:

Volume 8, 1979 (12 issues) \$172.00 (outside the U.S., \$195.00). Price for individual subscribers certifying that the journal is for their personal use, \$86.00 (outside the U.S., \$102.00).

Volume 9, 1980 (12 issues) \$190.00 (outside the U.S., \$215.00). Price for individual subscribers certifying that the journal is for their personal use, \$95.00 (outside the U.A., \$111.00).

Second-class postage paid at New York, N.Y., and at additional mailing offices.

Printed in U.S.A..

Journal of Solution Chemistry is published monthly by Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. Subscription orders should be addressed to the publisher. *Journal of Solution Chemistry* is abstracted or indexed in Biological Abstracts, Chemical Abstracts, Referativnyi Zhurnal, and Water Resources Abstracts. © 1979 Plenum Publishing Corporation. *Journal of Solution Chemistry* participates in the program of Copyright Clearance Center, Inc. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the stated per-copy fee through the Copyright Clearance Center, Inc. for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. It does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts.

CONTENTS

Vol. 8, No. 1

January 1979

- Osmotic and Activity Coefficients of Ammonium Thiocyanate in
Aqueous Solutions at 25°C

1

E. Kálmán and K. Schwabe

- Apparent Molal Heat Capacities of Organic Solutes in Water. V.
Aminoalcohols, Aminoethers, Diamines, and Polyethers

5

Sergio Cabani, Sheila T. Lobo, and Enrico Matteoli

- Adiabatic and Isothermal Apparent Molal Compressibilities of
Organic Compounds in Water. I. Cyclic and Open-Chain
Secondary Alcohols and Ethers

11

Sergio Cabani, Giovanni Conti, and Enrico Matteoli

- Hydrophobic Hydration of Some Different Types of Quaternary
Ammonium Bromides in Mixtures of Water and *N,N*-
Dimethylformamide

25

*Wim J. M. Heuvelsland, Cees de Visser, Gus Somsen, Antonio
LoSurdo, and Wen-Yang Wen*

- Osmotic Coefficients of Aqueous Sodium Carbonate Solutions at
25°C

35

R. A. Robinson and J. B. Macaskill

- Specific Ionic Interactions in the Quaternary Systems HCl-NaCl-
KCl-Water and HCl-NH₄Cl-KCl-Water at 25°C

41

Chee-Yan Chan, Kean H. Khoo, and T. K. Lim

- Electrolytic Conductance for Gurney-Friedman Models

53

Werner Ebeling, Rainer Feistel, and Rainer Sändig

- A Study of Metal Complexes of a Naturally Occurring Macroyclic
Ionophore—Monensin

83

John G. Hoogerheide and Alexander I. Popov

The Influence of Cyclic Alcohols on the Temperature of Maximum Density of Water 97

Digby D. Macdonald, Alice Maclean, and James B. Hyne

Solvent Effect on Pyridine Derivatives. Molecular Iodine Donor-Acceptor Equilibria. The Isoquinoline-I₂-Organic Solvent System and the 2,4-Lutidine-I₂-Organic Solvent System 105
I. Uruska and H. Karaczewska

The Ionization of Trichloroacetic Acid and Evidence for an Unusual Type of Ion Pairing 113

O. D. Bonner and Paul R. Prichard

The Standard Transported Entropy of Chloride Ion in H₂O and D₂O 125
Jeong-long Lin

The Static Dielectric Constant of Solutions of Water in *n*-Alcohols at 15, 25, 35, and 45°C 135

Alessandro D'Aprano, Dorina I. Donato, and Eugenio Caponetti

Conductance Studies on Lithium Salt-Acetonitrile Solutions at 25°C 147
Harry P. Hopkins, Jr., D. V. Jahagirdar, and Alan B. Norman

Heat of Dilution of Monomethylurea in Aqueous Solutions at 25°C 157
Guido Barone, Giuseppina Castronuovo, Vittorio Elia, and Agostino Menna

Conductance Equation of Dilute Mixed Strong Electrolytes. II. Hydrodynamic and Osmotic Terms in Relaxation Field 165
Mou-shan Chen

Free Energies of Transfer of Alkali Metal Halides in Isodielectric Acetonitrile and Ethylene Glycol Mixtures at 25°C 175
Kumardev Bose and Kiron K. Kundu

The State of Dissolved Benzene in Aqueous Solution 187
William J. Green and Henry S. Frank

Ion Solvation in 3-Methyl-2-Oxazolidone 197
Nahla Saleh and Joseph A. Caruso

Methods for the Analysis of Ternary Free-Diffusion Processes by the
Rayleigh Optical Interferometric Method

John G. Albright and Bette C. Sherrill

201

- Measurement of Isothermal Diffusion Coefficients at 37°C in the
Systems Glycine-NaCl-H₂O, DL- α -Alanine-NaCl-H₂O,
and DL- α -Aminobutyric Acid-NaCl-H₂O

Bette C. Sherrill and John G. Albright

217

- Thermodynamics of Some Perfluorocarbon Gases in Water

Wen-Yang Wen and John A. Muccitelli

225

- Solvent Polarity Studies. Part I. New Z Values and Relationships with
Other Solvent Polarity Scales

Trevor R. Griffiths and Donald C. Pugh

247

Vol. 8, No. 4

April 1979

- Transfer Free Energies of Some Ions from Water to Dimethyl-
sulfoxide-Water and Urea-Water Mixtures

Kiron K. Kundu and Asim K. Das

259

- Partial Molal Volumes and Adiabatic Compressibilities of Dodecyl-
polyoxyethylene Glycol Monoethers in Water at 5, 25,
and 45°C

Shigeharu Harada and Tsurutaro Nakagawa

267

- Ionic Interactions in the System HBr + BaBr₂ + H₂O at 25°C

Kean H. Khoo, Tiong-Koon Lim, and Chee-Yan Chan

277

- Magnesium-25 NMR Studies of Magnesium Salts and Complexes in
Nonaqueous Solvents

Pierre-Henri Heubel and Alexander I. Popov

283

- The Structure of Binary Liquids. The Kirkwood-Buff Theory of
Liquid Mixtures, Illustrated on the Basis of the Systems
Water/Methanol, Water/Ethanol, and Cyclohexane/2,3-
Dimethylbutane, as a Link Between Thermodynamic
Data and X-ray and Neutron Scattering Results

M. C. A. Donkersloot

293

- Divalent Sulfate Ion Pairs in Aqueous Solutions at Pressures up to
2000 atm

F. H. Fisher and A. P. Fox

309

- Ionization of Aqueous Benzoic Acid: Conductance and Thermodynamics**

Laurence E. Strong, Thomas Kinney, and Paul Fischer

329

- Osmotic and Activity Coefficients of Aqueous Bile Salt Solutions at 25, 37, and 45°C**

Patrick Carpenter and Siegfried Lindenbaum

347

- The Influence of Correlation of Molecular Orientations and of Molecular Flexibility on Excess Volumes of Mixtures of Branched and Linear Alkanes**

H. Klunder and C. L. de Ligny

359

- On Pseudo-clathrate Hydrate Structure in Aqueous Solutions of Tetrahydrofuran**

S. R. Gough

371

- Individual Equivalent Conductances of the Major Ions in Seawater**

Alain Poisson, Michèle Périé, Jacques Périé, and Marius Chemla

377

- Vibrational Spectral Studies of Ion–Ion and Ion–Solvent Interactions.**

III. Zinc Nitrate in Water/Acetonitrile Mixtures

Yu-Keung Sze and Donald E. Irish

395

- The $c \log c$ Contribution to the Electrolyte Conductance and Onsager's Reciprocal Relation**

Rainer Sändig and Rainer Feistel

411

- A Rationalization of the Enthalpy of Protonation of Polyamines**

Rolando Barbucci and Vincenzo Barone

427

- Relative Viscosity and Viscosity Coefficients of Aqueous Azonia-spiroalkane Bromides at 25°C**

Antonio Lo Surdo

439

Aqueous Solutions of Azoniaspiroalkane Halides. VI. Apparent Molal Volumes and Apparent Molal Heat Capacities of Chlorides and Iodides

449

Antonio Lo Surdo, Wen-Yang Wen, and Carmel Jolicoeur

Diffusion of Symmetrical and Spherical Solutes in Protic, Aprotic, and Hydrocarbon Solvents

461

D. Fennell Evans, Toshihiro Tominaga, and C. Chan

^{205}Tl NMR Studies: Ion Pairing of Ti^+ and $(\text{CH}_3)_2\text{Ti}^+$ with NO_3^- and ClO_4^- in Various Solvents

479

Richard W. Briggs, Kenneth R. Metz, and James F. Hinton

Vol. 8, No. 7

July 1979

Density, Conductance, Transference Numbers, and Diffusion Measurements in Concentrated Solutions of Nickel Chloride at 25°C

489

Robin H. Stokes, Sonny Phang, and Reginald Mills

Ionic Enthalpies of Transfer from Water to Water-Sulfolane Mixtures

501

Maurizio Castagnolo, Giuseppe Petrella, Mario Della Monica, and Antonio Sacco

Conductance Equation of Dilute Mixed Strong Electrolytes. III.

509

Electrophoresis

Mou-shan Chen

Application of Covington's Nonstatistical Distribution of Solvate Species Theory to the Preferential Solvation of Ti^+ in Various Binary Solvent Systems

519

Richard W. Briggs and James F. Hinton

The Phase Diagram and Supercooling Conditions for the $\text{Ca}(\text{NO}_3)_2-\text{CaCl}_2-\text{H}_2\text{O}$ System

529

P. Pacák and I. Sláma

Conductance and Solvation of Uni-Univalent Electrolytes in Hexamethylphosphotriamide

539

E. M. Hanna and N. J. Al-Salihi

F. H. Fisher

Vol. 8, No. 8

August 1979

Ion Pairing of Quaternary Salts in Solvent Mixtures

557

Silvia Schiavo, Raymond M. Fuoss, Giancarlo Marrosu, and Giuseppe Guida

Temperature Dependence of Excess Enthalpies for Systems Containing Normal Hexadecane

573

*Melvin D. Croucher and Donald Patterson*Standard Molar Enthalpies, Volumes, and Heat Capacities of Adamantane in Cyclohexane, *n*-Hexane, and Carbon Tetrachloride. Interpretation Using the Scaled-Particle Theory

579

*Nicole Morel-Desrosiers and Jean-Pierre Morel*Thermochemical Behavior of Mixtures of *N,N*-Dimethylformamide with Dimethylsulfoxide, Acetonitrile, and *N*-Methylformamide: Volumes and Heat Capacities

593

*Cees de Visser and Gus Somsen*On the Role of Solvent in Complexation Equilibria. I. The Acid-Base Chemistry of Some α,ω -Diaminocarboxylic Acids in Water-Dioxane Mixed Solvents

601

Robert Griffith, Jr., Lakshmikumar Pillai, and Mark S. Greenberg

Vol. 8, No. 9

September 1979

Acid Properties of Some Phosphonocarboxylic Acids

615

Pierre-Henri C. Heubel and Alexander I. Popov

Electrical Conductance of Aqueous Solutions of KCl Solutions at Pressures up to 2000 atm

627

F. H. Fisher and A. P. Fox

On the Role of Solvent in Complexation Equilibria. II. The Acid-Base Chemistry of Some Sulphydryl and Ammonium-Containing Amino Acids in Water-Acetonitrile Mixed Solvents

635

Lakshmikumar Pillai, Roger D. Boss, and Mark S. Greenberg

Vapor Pressures of Aqueous Solutions of (Ag, Tl, Cs)NO₃ at 98.5°C

647

Marie-Christine Abraham, Maurice Abraham, and James Sangster

The Solubility and Isotopic Fractionation of Gases in Dilute Aqueous Solution. I. Oxygen

655

Bruce B. Benson, Daniel Krause, Jr., and Mark A. Peterson

Vol. 8, No. 10

October 1979

Evaluation of Single-Ion Conductances in Nonaqueous Solvents at 25°C by the Use of Tetrabutylammonium Tetrabutylboride as a Reference Electrolyte

691

Dip Singh Gill

The Mutual Diffusion Coefficients of NaCl-H₂O and CaCl₂-H₂O at 25°C from Rayleigh Interferometry

701

Joseph A. Rard and Donald G. Miller

Partial Molal Heat Capacity of Aqueous Ferrous Chloride from Measurements of Integral Heats of Dilution

717

Ernest E. Bernarducci, Lester R. Morss, and Andrew R. Mikszta

Ultrasonic Vibration Potentials, Apparent Molal Volumes, and Apparent Molal Heat Capacities of 1:1 Electrolytes in Acetonitrile

729

Raoul Zana, Gérard Perron, and Jacques E. Desnoyers

The Mutual Diffusion Coefficients of Na₂SO₄-H₂O and MgSO₄-H₂O at 25°C from Rayleigh Interferometry

755

Joseph A. Rard and Donald G. Miller

Vol. 8, No. 11

November 1979

Viscosity of Ternary Mixtures. II. Water-*tert*-Butyl Alcohol-Alkali Halides

767

Marc Palma and Jean-Pierre Morel

Cation-Crown Ether Complex Formation in Water. II. Alkali and Alkaline Earth Cations and 12-Crown-4, 15-Crown-5, and 18-Crown-6	779
<i>Harald Høiland, John A. Ringseth, and Thorvald S. Brun</i>	
Viscosity Studies of Solutions of Water in <i>n</i> -Aliphatic Alcohols at Various Temperatures	793
<i>Alessandro D'Aprano, Ines Dorina Donato, Eugenio Caponetti, and Valeria Agrigento</i>	
Temperature and Composition Dependence of the Viscosity of Highly Concentrated Aqueous Electrolyte Solutions	801
<i>I. Sláma and Z. Kodejš</i>	
Ionic Interactions in Solutions. IV. Conductance Theory of Binary Electrolytes for Hamiltonian Models	809
<i>Jean-Claude Justice and Werner Ebeling</i>	
Vol. 8, No. 12	December 1979
Absolute Determination of the Conductivity of Electrolytes. Double Differential Cell with Adjustable Constant	835
<i>P. Saulnier</i>	
Determination of Electrolyte Conductivity of a 0.01 D Aqueous Potassium Chloride Solution at Various Temperatures by an Absolute Method	847
<i>P. Saulnier and J. Barthel</i>	
The Viscosity of Aqueous Electrolyte Solutions and the TTG Model	853
<i>J. V. Leyendekkers</i>	
The Formation of Cation-Ligand Complexes of Tributylammonium Cation with Diethyl Carbonate, Ethylene Carbonate, Pro- pylene Carbonate, 4-Butyrolactone, Ethyl Acetate, and Cyclopentanone in <i>o</i> -Dichlorobenzene at 25°C	871
<i>Mary Anne Jones and W. R. Gilkerson</i>	
Effect of Pressure on the Conductivities of HCl and KCl in Water at 0°C	881
<i>Masakatsu Ueno, Masaru Nakahara, and Jiro Osugi</i>	
Standard Potential of the Silver-Silver Chloride Electrode in 10, 20, and 40 wt.% Ethanol/Water Solvents at 25, 0, -5, and -10°C	887
<i>Munessar Sankar, J. B. Macaskill, and Roger G. Bates</i>	

Aqueous Solutions of Lithium Hydroxide at Various Temperatures: Conductivity and Activity Coefficients	897
<i>Horacio Corti, Rosa Crovetto, and Roberto Fernández-Prini</i>	
Notice of Meeting	909
Author Index to Volume 8	911
Subject Index to Volume 8	915

